京都大学
KYOTO UNIVERSITY

Local Energy Governance about Japanese Case: RE in Japan at Community Level

International workshop on "Local Energy Governance in an Aging Society: Toward a Sustainable Community using Renewable Energy"

25-26 June 2016, Hanoi

Takuo Nakayama, Ph.D.

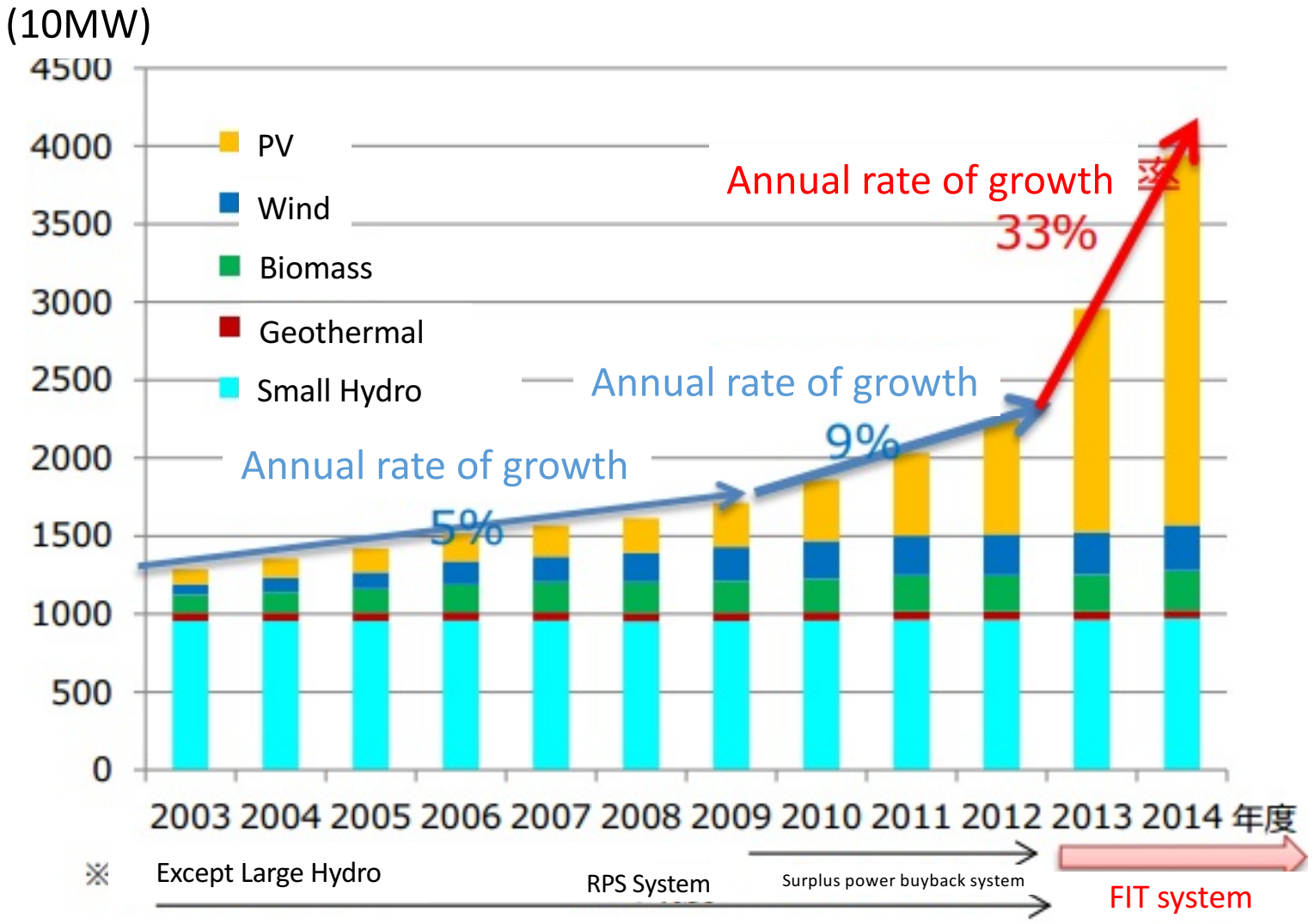
Assistant Professor

Graduate School of Economics, KYOTO UNIVERSITY

The Era of Renewable Energy (RE)

- Japanese Situation
  - After FUKUSHIMA DISESTER
  - Issue of Widespread use of RE
- Quantitative expansion is not only the purpose
  - In the first place REs are decentralized (distributed) energy sources
  - REs can contribute to local sustainable development
  - It is necessary to raise to make it so
- Case study of ”Ohisama Shinpo Energy CO., LTD”

Increasing Renewable Energy Capacity in Japan



Source: METI

Japanese Feed-in Tariff (FIT) System

- Japanese FIT system has Introduced in July 2012
  - Remarkable growth of REs Capacity (33% from 2012 to 2014)
  - Promoted investment especially in PV
- Some problem has occurred
  - Grid Capacity (PV or Wind are Variable Power)
  - Necessity of transformation from ”Centralized Power System”(20 century style) to ”Decentralized Power System”(21 century style)
- By the way, Japanese FIT system is one of the most successful public policy
  - Compared to “Environmental Taxes” or “Emission Trading Scheme”

From Centralized System to De-Centralized System

1. Trend of De-Centralized power supply
   - In the first place, REs (Solar, Wind, Small Hydro and Biomasses) are De-Centralized power sources

2. Another purpose of Feed-in Tariff System in Japan
   - Revitalization of local economy
     - In addition to quantitative expansion of REs
     - By ensure the profitability

Japanese Challenge toward Local Revitalization by De-Centralized REs

- Attracting external companies does not contribute revitalization of local economy
  - This business model bring few land rent or property tax
- RE profit should be attributed to local subject
  - Local residents or local company have to launch RE business by themselves
    - Without rely on external large company
  - It is quite hard way but local subject cannot make new income or employment

How to Implement “Local Energy Governance” ?

- To make local fund flow
  - Local funding collaborate with “Local Banks” or “Local Credit Associations”
- For sustainable local development
  - Re-Investing REs profit in local subject
- It is not easy but impossible
- This challenge is worth a try
  - De-Centralized REs could be a core of local economy revitalization
  - Construction of local unite tackle in relationship
    - How to develop human resources?
    - How to success the RE business?

Technical and Social Issues of RE

- Technical issue of RE
  - Focused on mainly up to now
- Social issue of RE
  - Developing human resources
  - Company organization or Corporate form
  - Constructing the business model
  - Structure of the governance
  - Finance
- Based of Technical dimension, Social dimension is more important to success RE business.

What is “Local Energy Governance”?

1. Local residents and local companies create business entity in cooperation each other
2. Start electric power sales business by converting local resources to energy
3. Make local economic circulation
4. Go toward sustainable local development

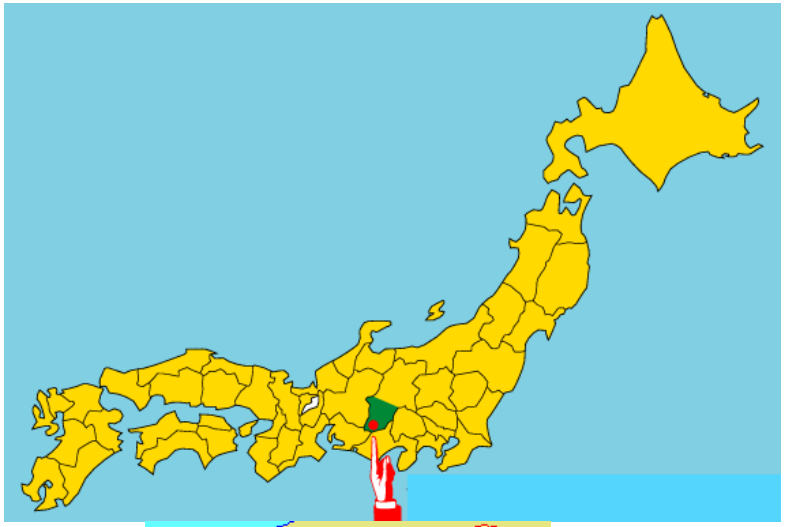
- “Local Autonomy Force” is inevitable for “Local Energy Governance”
  - Local residents have to discuss and make decision each other
  - Implement the decision by themselves

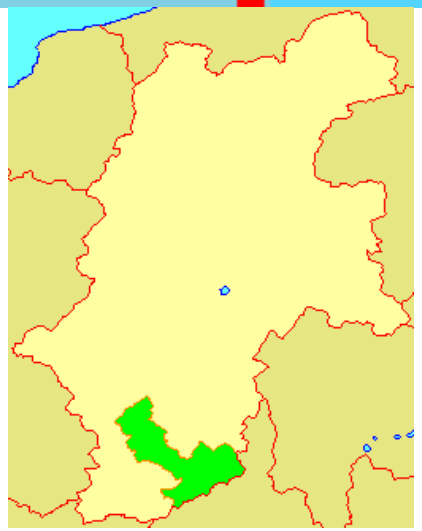
Purpose of “Local Energy Governance” in Japan

- Transition from Centralized power system to De-Centralized power system
- Revolutionary change of energy supply system
  - Centralized system : 20 century style
  - De-Centralized system : 21century style
- What does “De-Centralization of Energy Supply” mean?
  - Democratization of energy production and consumption
  - Democratization and Independence of local economy

“Ohisama Shinpo Energy Co., Ltd.” as a model of Japanese “Local Energy Governance”

- “Ohisama Shinpo Energy Co., Ltd.” in Iida City, Nagano Prefecture
- Population of Iida City:
  - 101,618 (as of Feb. 2016)
  - 4th largest
- Area:
  - 658.66㎢
- Industry
  - Agriculture
  - Manufacturing



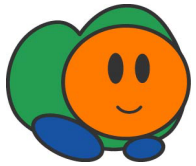


Establishment “Ohisama Shinpo”

- “Ohisama” Symposium
  - Sep. 2001
  - Citizen of Iida City agreed to promote PV toward global warming
- Establishment of “Minami Shinsyu Ohisama Shinpo” as a Non Profitable Organization (NPO)
  - Feb. 16, 2004
  - “Local Energy Production for Local Consumption” principle

First activity of “Ohisama Shinpo”

- 3kW PV on Nursery roof top
  - Donation type
  - Enhanced consciousness to local children, nursery staff, parents and residents for importance of environmental preservation
  - ”Sanpo-Chan”, trade mark of “Ohisama Shinpo” worked well for children education about Environmental Energy issue



“Mahoroba” project (2004)

- ”Mahoroba（まほろば）” means Nice Place or Livable Place in Japanese old letter
- Partnership with local government, private sector and Non Profitable Organization in this area
- Introduction of PV, Pellet boiler and stove, ESCO, Natural energy college management
- Establishment of “Ohisama Shinpo” Limited company
  - Dec. 2004
  - As an operating body of this project

Citizen's Joint Power Station System

- How to fund?
  - Citizen's co Investment (Joint Investment)
  - Danish wind power model
    - Farmers invest together wind power generation
    - Profit can be allocated based on the investment ratio
    - Japanese pioneer is "Hokkaido Green Fund"
      - "Hamakaze-chan" (2001)
      - Hamatonnbetsu town in Hokkaido


資料）NPO法人北海道グリーンファンド

- Apply Citizen's Joint Power Station System
  - Started citizens investment from Feb.2005
  - Wanted amount (201,500,000JPY) had expired only 2 month
- This system became universal in Japan

Citizens co Investment

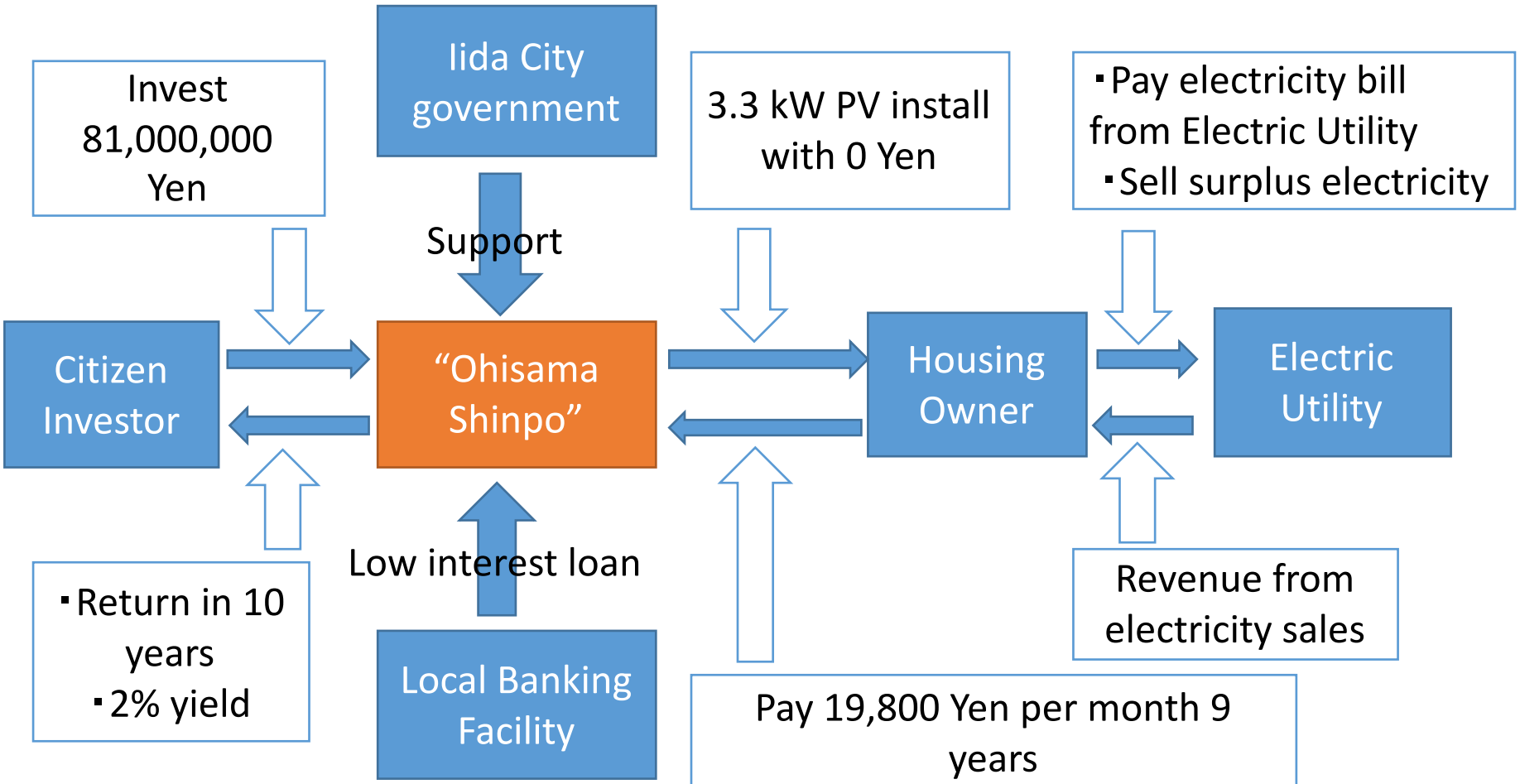
- Not Charity but Profitable
  - Investor can get allotment
- Change the “culture” about Environmental Energy issue
  - In many cases, Environmental Energy Issue projects don’t have profitability
  - To solve the issue, grant of fund (taxes and donation) are usually casted
  - RE power generation can not only profitable but also contribute to solve Environmental Energy issue

  (if FIT system exist as of now in Japan)
    - Relationship with Environmental issue and Economic issue are not necessarily trade-off
    - This is revolutionary

Making Local Money Flow

- Large share of Citizen Investors are living in Metropolis (e.g. Tokyo or Osaka)
- Local profit from REs are back to Metropolis
  - As form of principle or allotoment
- Necessity of Local funding
  1. Invest local money to RE project
  2. Re-invest RE profit to local industry
  3. Sustainable local development will be available
- It is important to make Local Fund Flow based on RE

“Ohisama 0 Yen” System



Source: Morotomi (2015) p.22

”Ohisama 0 Yen” System

- No initial Investment for household PV (3.3kW)
  - “Ohisama Shinpo” set PV system on housing roof top
  - Housing owner pay 19,800 Yen per month for 9 years
    - Housing owner can sell their surplus electricity generated by PV
    - If housing owner reduce power consumption, selling surplus power increase (Incentive for energy saving)
- After 9 years, PV system is transferred to the housing owner
- Lowering the hurdle to introduce PV to housing owner

Role of Local Banking Facilities

- In this system, “Ohisama Shinpo” bears initial PV system and installation cost
- Financing of “Ohisama Shinpo” becomes severe
- Local banking facilities (Iida Credit Union) play important role
  - Japanese Credit Union works mainly from local company or residents
  - Low-interest loan to “Ohisama Shinpo”
  - Iida City government also support this scheme
- RE power generation project is good investment project in Japan
  - In terms of Bank Finance
  - Expected return of investment as long as RPS or FIT scheme exist as of now in Japan

Example : Roof top PV system installed by “Ohisama 0 Yen” system

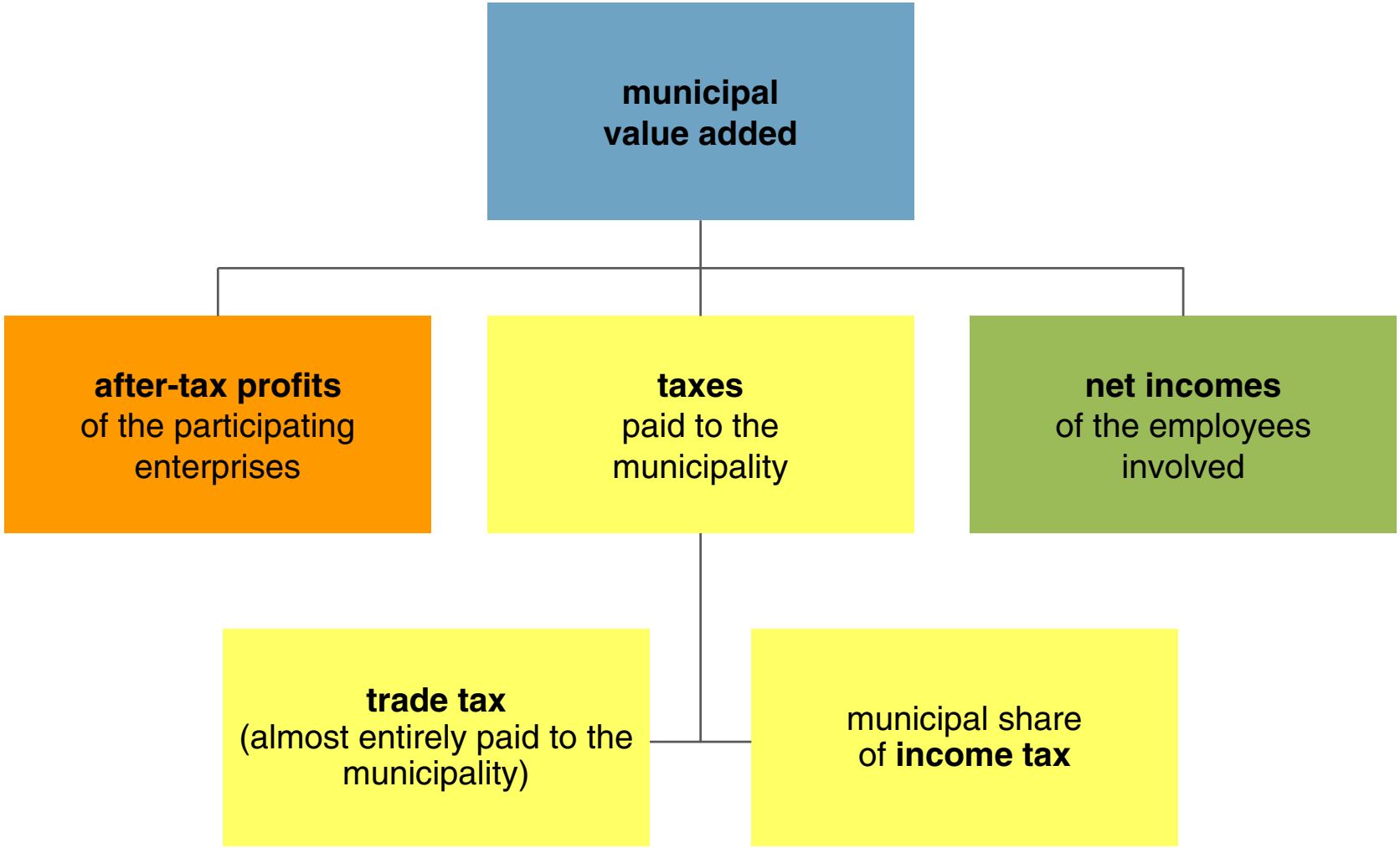
Iida City as Birth Place of Japanese Feed-in Tarrif (FIT)

- Aachen in Germany : Birth Place of FIT
  - Introduced FIT system ahead of the Federal government in 1995
  - At Municipality level
- Iida in Japan
  - Introduced FIT system ahead of the National government for “Ohisama Shinpo” (2005～)
  - Iida City beard the risk of variable electricity selling price
    - Under the Renewables Portfolio Standard (RPS) scheme in National level

Local Value Added Analysis

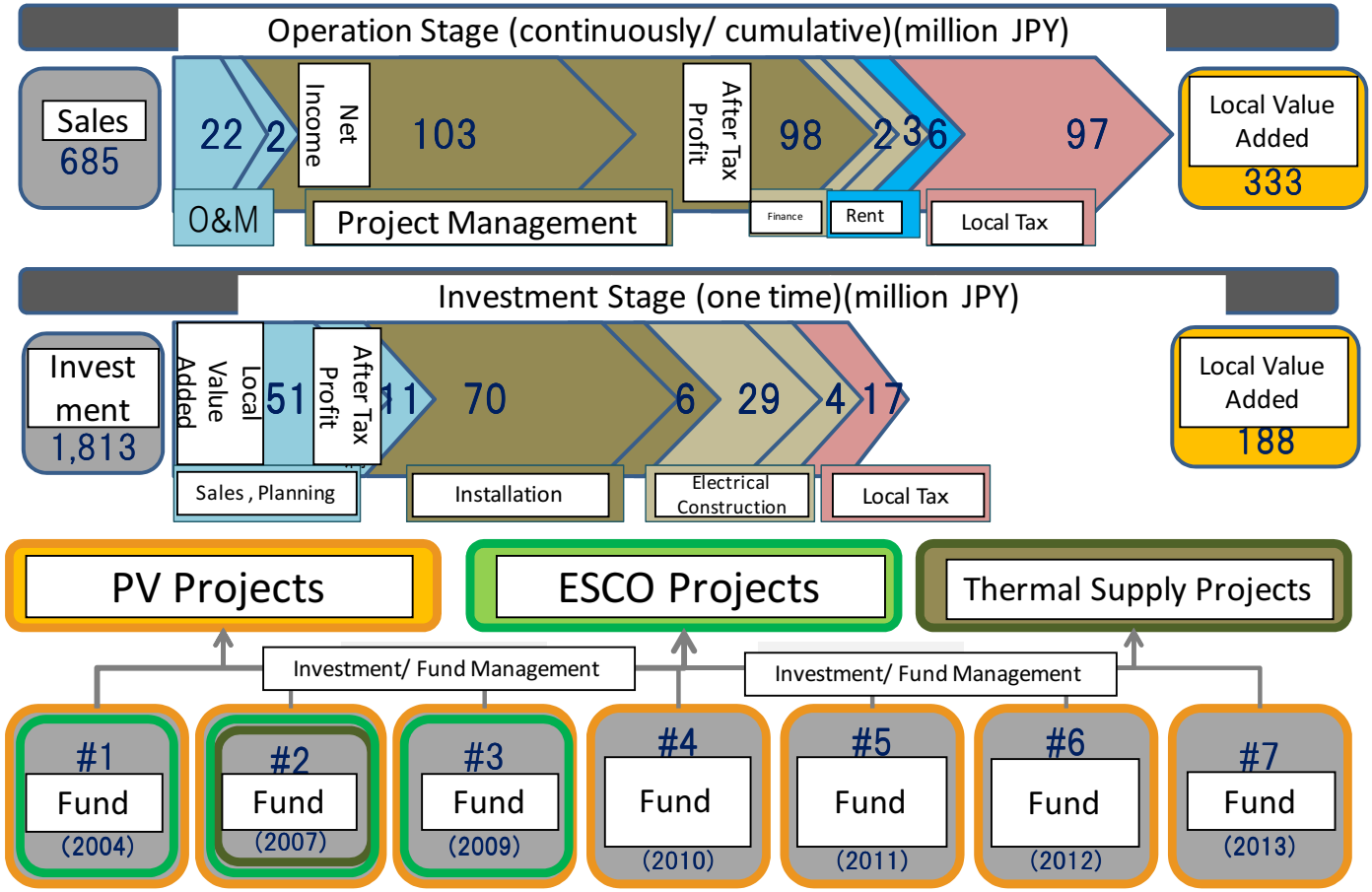
- Developed by Institute of Ecological Economics (Institut für ökologische Wirtschaftsforschung: IÖW) in Berlin
- Value Chain approach
  - Based on Porter M. E. (1985) *Competitive Advantage: Creating and Sustaining Superior Performance*
- Aim to measure RE economic effect precisely at municipal level
- Applying Japanese RE power sources

Components of Local Value Added



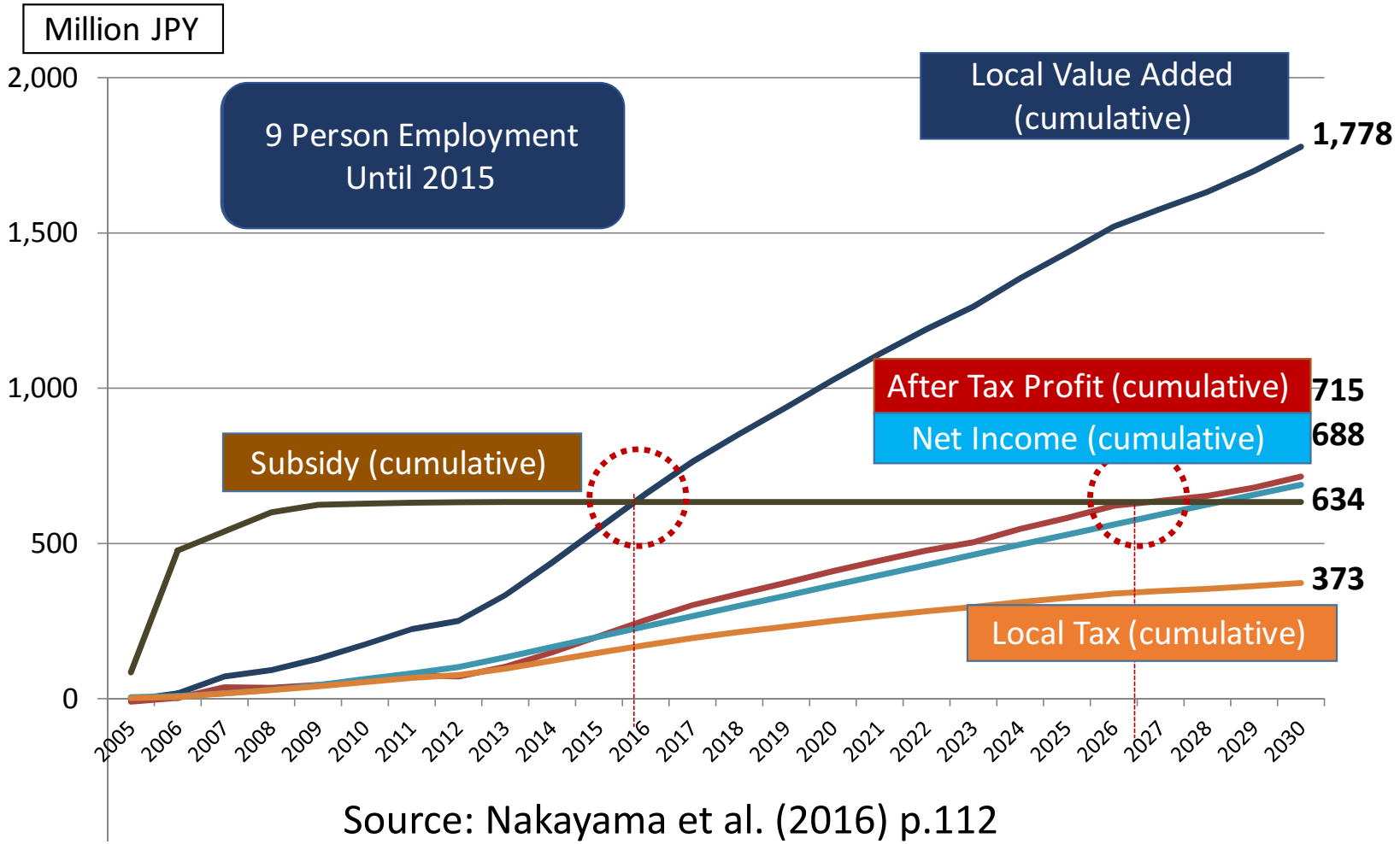
Source: Heinbach et al. (2014) p.4

Local Value Added from "Ohisama Shinpo" Projects



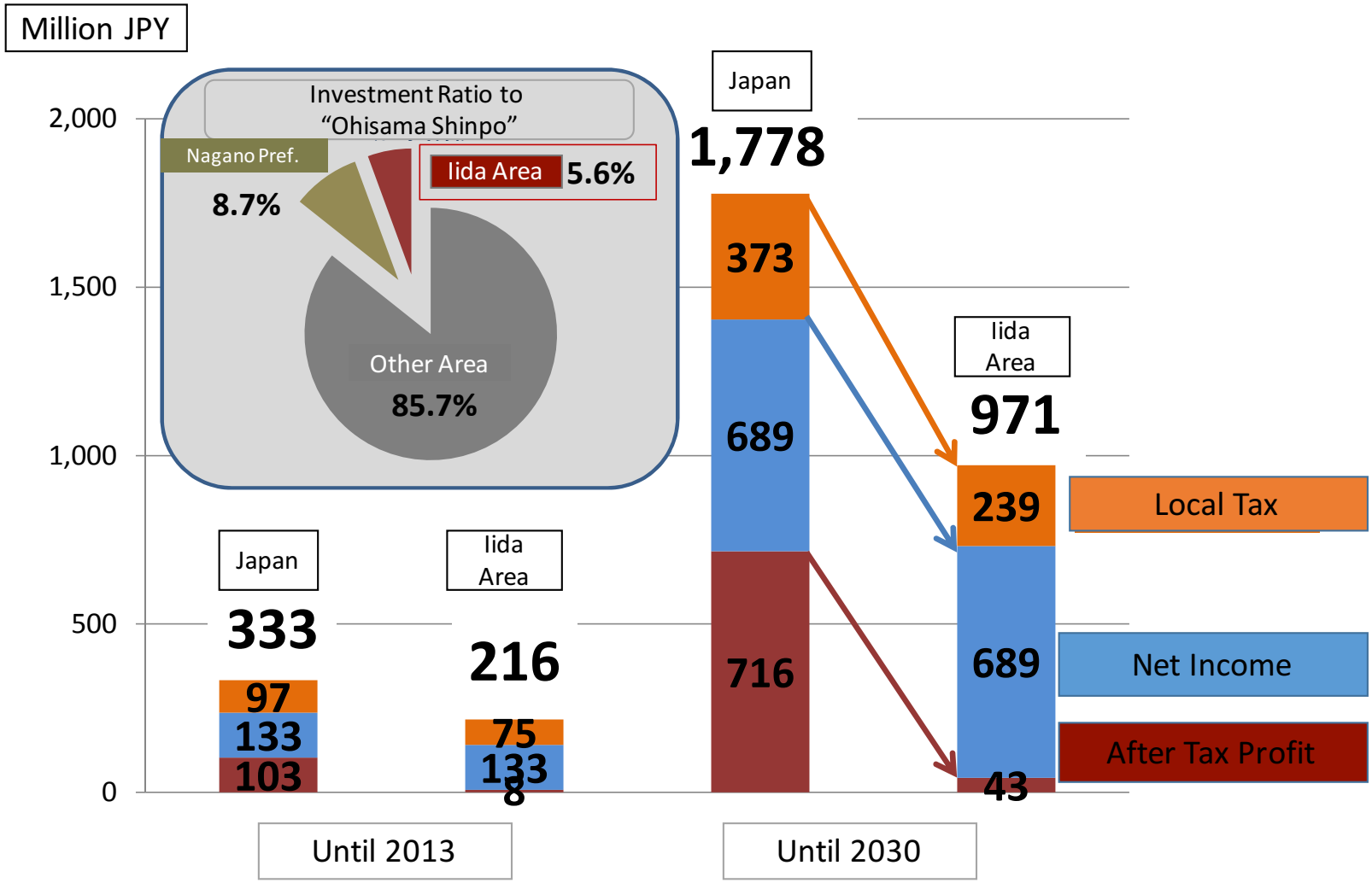
Source : Nakayama et al. (2016) p.110

Simulation of Local Value Added by “Ohisama Shinpo” Operation



Source: Nakayama et al. (2016) p.112

Simulation of Local Value Added of Iida Area: Investment Ratio



Source: Nakayama et al. (2016) p.112

Result : Simulation of Local Value Added from this Case Study

- RE investment at community or municipality level contribute Local Value Added creation
  - Cumulative Local Value Added exceed the subsidy for about 10 years in “Ohisama Shinpo” case.
  - Cumulative After Tax Profit of the RE operator exceed the subsidy for about 20 years in “Ohisama Shinpo” case.
- Local investment is the most important element for economic development of CRE (Community Renewable Energy)
  - Investment for CREs are mainly from metropolis now
  - After Tax Profit of CRE operator attribute metropolis
  - This is quite “MOTTAINAI” for local economy